

Table 2.4-3
CAD/CDF Disposal Option Summary
 Portland Harbor Superfund Site
 Portland, Oregon

Process Option Screening Criteria	Process Option Screening Subcriteria	In-water CAD	Nearshore CDFs		
		Swan Island Lagoon	Swan Island Lagoon	Terminal 4	Arkema
Process Option Concept Summary	NA	Conceptual design provided in 2012 draft Feasibility Study (FS). CAD is a 54-acre disposal site within Swan Island Lagoon. A berm will be constructed to contain the contaminated material. A 6-foot-thick cover was assumed to be required for effective isolation of the contaminated sediment. The estimated capacity is 280,000 cubic yards (cy) before consolidation. Wastes not designated for upland disposal could be placed in this CAD.	Conceptual design provided in 2012 draft FS. CDF is a 54-acre disposal site within Swan Island Lagoon. A berm will be constructed to contain the contaminated material. Imported fill material, including suitable dredged sediment and/or soil, would be placed as cover material above the water table in the CDF to bring the facility up to its design elevation. The estimated capacity is 1.4 million cy before consolidation. Wastes not designated for upland disposal could be placed in this CDF.	Detailed 60% design available. CDF consists of a 14-acre disposal site within Terminal 4, Slip 1. A berm will be constructed to contain the contaminated material. The CDF will be covered with fill and aggregate. The estimated capacity is 670,000 cy before consolidation. Wastes not designated for upland disposal could be placed in this CDF.	Conceptual design provided in draft Engineering Evaluation/ Cost Analysis (EE/CA). Two Arkema CDF options - a one berth option (4 acres) and a two berth option (8 acres) were provided with dredged material volume estimates of 25,700 cy and 73,800 cy, respectively. The CDF would be constructed of a sheetpile wall tied into the upland groundwater control slurry wall. An engineered impermeable cap would be placed over the top of the CDF to minimize infiltration. The CDF would only take Arkema waste.

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Effectiveness					
Long-Term Effectiveness and Permanence	Contaminant Migration from CDF After Construction	Contaminant migration modeling was not performed nor presented in draft FS. However, contaminant migration modeling was performed for the Swan Island CDF. This modeling indicates that the CAD can likely be designed to be effective at meeting Remedial Action Objectives (RAOs).	Contaminant migration modeling was performed and presented in the draft FS. Modeling results show that the CDF can be designed to be effective in meeting RAOs.	Contaminant migration modeling was performed and presented in draft FS. Modeling results show that the CDF can be designed to be effective in meeting RAOs.	Contaminant migration modeling was not performed nor presented in draft FS or draft EE/CA. Contaminants located at Arkema are currently identified in disposal decision tree as requiring upland disposal and this may not be suitable for disposal within a CDF. The mitigation strategy for contaminant migration from CDF included provisions for treatment, but it is not clear with treatment that RAOs can be met.
	Floodway Impacts to Willamette River	Hydrologic and hydraulic (H&H) modeling was not performed nor presented in the draft FS. Although an off channel location, potential impacts on flood rise and/or flood storage	H&H modeling was not performed nor presented in the draft FS. Although an off channel location, potential impacts on flood rise and/or flood storage may still exist.	H&H modeling was performed and presented in the 60% Design Analysis Report (DAR) for the Terminal 4 CDF. Modeling results showed no	H&H modeling was performed and presented in the draft EE/CA. Modeling results showed negligible impacts on flood rise and/or flood storage

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		may still exist. No mitigation strategy for flood rise impacts was presented.	No mitigation strategy for flood rise impacts was presented.	impacts on flood rise and/or flood storage due to construction of the CDF.	due to construction of the CDF.
Short-Term Effectiveness	Water Quality Impacts During Construction	Evaluation of short-term effects not provided in draft FS. Some short-term impacts to water quality are expected. Mitigation strategy for water quality impacts include construction in backwater area away from main channel and interim capping between filling seasons, as well as use of other engineered controls/BMPs.	Evaluation of short-term effects provided in the draft FS as Appendix Jb. Some short term impacts to water quality are expected. Mitigation strategy for water quality impacts include construction in backwater area away from main channel and interim capping between filling seasons as well as use of other engineered controls/BMPs.	Evaluation of short-term effects provided in the draft FS as Appendix Jb. Some short-term impacts to water quality are expected. Mitigation strategy for water quality impacts include construction in terminal area away from main channel and interim capping between filling seasons, as well as use of other engineered controls/BMPs.	Evaluation of short-term effects not provided in the draft FS or draft EE/CA. Potential significant impacts to water quality are expected due to the type of contamination present (including non-aqueous phase liquid [NAPL]) and location on main channel. Mitigation strategy for water quality impacts include use of engineered controls/BMPs. Basalt bedrock within a few feet of top of sediment bed creates challenges for construction of engineered controls and effective isolation of contaminants.
Implementability					

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Administrative Feasibility	Proponents for CDF Construction	No current proponent exists.	No current proponent exists.	A current proponent exists (Port of Portland).	A current proponent exists (LSS/Arkema).
Administrative Feasibility	Land ownership coordination	Lands within the footprint of the proposed CAD are owned by the State of Oregon and managed by the Department of State Lands (DSL). No current discussion with DSL or surrounding property owners is underway.	Lands within the footprint of the proposed CDF are owned by the State of Oregon and managed by DSL. No current discussion with DSL or surrounding property owners is underway.	Lands within the footprint of the proposed CDF are owned by the State of Oregon and managed by DSL as well as the Port of Portland. The Port of Portland (the CDF proponent) has been in discussions with DSL regarding acquisition of the remaining submersible land from DSL that is necessary to implement the project.	Lands within the footprint of the proposed CDF are owned by the State of Oregon and managed by DSL. No current discussion with DSL or surrounding property owners is underway. However, according to the conceptual CDF plan for Arkema, preliminary discussions with DSL regarding options for leasing lands under DSL management have occurred.

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Technical Implementability	CDF Constructability Issues Due to Location	Conceptual design provided in the draft FS. The CAD concept is dependent on a berm to contain contaminated sediments. The location is off channel and the berm should be constructible, but the concept has not advanced sufficiently to determine whether there are technical issues within the backwater area of the Willamette River that cannot be overcome through design.	Conceptual design provided in the draft FS. The CDF concept is dependent on a berm to contain contaminated sediments. The location is off channel and the berm should be constructible, but the concept has not advanced sufficiently to determine whether there are technical issues within the backwater area of the Willamette River that cannot be overcome through design.	Detailed 60% design available. Although the CDF concept is dependent on a berm to contain contaminated sediments, the location is off channel and the berm appears, from design analyses, to be constructible. No significant issues related to the location in the off channel area of the Willamette River have been identified that cannot be overcome through design.	Conceptual design provided in the draft EE/CA. Due to the on-channel location, the CDF concept is dependent on the installation of rigid containment. Basalt bedrock within a few feet of the top of the sediment bed and deeper water near the navigation channel of the Willamette River creates challenges for construction and effective isolation of contaminants with rigid containment. The concept has not advanced sufficiently to conclude that this and other technical issues related to the on-channel location can be overcome through design.

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Technical Implementability	Compatibility with Current and Potential Future Land and Waterway Use	CAD would be located in an off-channel (backwater) area of the Willamette River. Use of the potential Swan Island CAD would eliminate ongoing commercial water-dependent uses of this portion of the Site. The completion of the CAD would create approximately 29 acres of shallow water habitat, which may have value from a habitat mitigation or restoration perspective. However, there is a lack of information on whether these potential uses are viable due to a lack of a proponent.	CDF would be located in an off-channel (backwater) area of the Willamette River. Use of the potential Swan Island CDF would eliminate or impact ongoing commercial water-dependent uses of this portion of the Site unless the channel end of the CDF was repurposed as a terminal slip. However, there is a lack of information on whether these potential uses are viable due to a lack of a proponent.	The CDF would be located in an off-channel (slip) area of Terminal 4 adjacent to the navigation channel of the Willamette River. Use of the potential Terminal 4 CDF would eliminate commercial water-dependent uses of Slip 1; however, other slips are available. In addition, the CDF would include additional space for Port of Portland operations.	The CDF would be located in an on-channel location and would be adjacent to the navigation channel of the Willamette River for the purpose of constructing a shipping berth. The conceptual design indicates that the CDF would be constructed on the upland side of the harbor-line which may enhance future uses of the Arkema property.
Costs					

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Capital Cost		No cost estimate available in the draft FS or EE/CA.	No cost estimate available in the draft FS or EE/CA.	Detailed cost estimate provided in the draft FS. Disposal cost estimated at \$87/cy.	Cost estimate provided in the draft EE/CA. Disposal cost estimated at \$166/cy.
O&M Cost		Not directly included in the FS cost estimate.	Not directly included in the FS cost estimate.	Operations and maintenance (O&M) costs of \$1.5 million were included in the 60% design estimate.	O&M costs of \$245,000 were included in the EE/CA cost estimate.
Summary of Process Option Screening (Retained/Eliminated)					
Draft FS (Prepared by LWG)		Retained	Retained	Retained	Retained
Revised FS Section 2 (Prepared by EPA)		Based on available information, not retained for assembly of remedial alternatives in revised FS due to the following factors: Effectiveness: Lack of information supporting long- and short-term effectiveness.	Based on available information, not retained for assembly of remedial alternatives in revised FS due to the following factors: Effectiveness: Lack of information supporting long-term effectiveness.	Based on available information, retained as representative process option for on-site disposal. No significant deficiencies regarding effectiveness, implementability, or cost were identified that cannot be mitigated during	Based on available information, not retained for assembly of remedial alternatives in revised FS due to the following factors: Effectiveness: Lack of information supporting long-term effectiveness; significant short-term effectiveness issues.

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		Implementability: Lack of information supporting technical implementability; significant administrative feasibility issues.	Implementability: Lack of information supporting technical implementability; significant administrative feasibility issues.	development of alternatives.	Implementability: Significant technical implementability issues.
		Cost: Lack of cost information.	Cost: Lack of cost information.		

Notes:

Color Coding

Green - Minor or no issues

Yellow – Moderate issues

Red – Significant issues

CAD – Confined Aquatic Disposal Facility

CDF – Confined Disposal Facility